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DOE/NNSA/NA-21 FORABIENIAWSKI/KCUMMINS/SDICKERSON
NSC FOR GSAYMORE/JCONNERY
STATE FOR WHA/BSC, WHA/EPSC AND EEB/ESC/IEC
STATE/ISN/FO FOR RSTRATFORD
STATE/ISN/NESS FOR BPLAPP/DFENSTERMACHER
STATE/VC FOR RGOTTEMOELLER

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SUBJECT: GLOBAL THREAT REDUCTION INITIATIVE EFFORTS TO REMOVE
BRITISH- AND FRENCH-ORIGIN HEU FUEL FROM CHILE

¶1. SUMMARY: The U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA), Global Threat Reduction Initiative (GTRI), met with the Chilean Nuclear Energy Commission (CCHEN) from April 21-23 to begin planning for the removal of the British- and French-origin highly enriched uranium (HEU) nuclear fuel from Chile to the United States. At the conclusion of the visit, a meeting summary was signed by Deputy Assistant Secretary for Global Threat Reduction, Andrew Bieniawski, and the Executive Director of CCHEN, Fernando Lopez. The summary states that the HEU nuclear fuel in Chile meets DOE-NNSA acceptance criteria and formalizes a joint GTRI-CCHEN commitment to complete the removal by April 2010, effectively removing all HEU from Chile. Most importantly, the removal of this material to the U.S. will contribute to President Obama's goal to secure all vulnerable nuclear material within four years and will be completed prior to the May 2010 NPT REVCON. End Summary.

¶2. BACKGROUND: The U.S. Department of Energy (DOE) seeks to prevent terrorists from acquiring the nuclear and radiological material that could be used in weapons of mass destruction and other acts of terrorism. GTRI supports this goal by reducing and protecting vulnerable nuclear and radiological material at civilian sites worldwide. A cooperative, voluntary program, GTRI provides international support for national programs to identify, secure, recover, and/or dispose of these materials that pose a threat to the international community. GTRI is currently cooperating with more than 124 countries worldwide, including numerous countries throughout the Latin American region.

¶3. When GTRI was founded in May 2004, the program was only authorized to repatriate certain types of U.S.-origin HEU spent nuclear fuel under the Foreign Research Reactor Spent Nuclear Fuel (FRRSNF) acceptance program to the United States. Non-U.S.-origin spent nuclear fuel was not authorized to be brought to the United States. However, this policy was changed in January 2009, and GTRI now has the authority to remove non-U.S.-origin HEU spent nuclear fuel to the U.S., provided that the material meets certain acceptance criteria. During the April 2009 visit to Chile, GTRI officials determined that the British- and French-origin HEU nuclear fuel meets the required acceptance criteria, thereby making the material eligible for removal to the United States. End Background.

Two Research Reactors in Chile

¶4. The Chilean Nuclear Energy Commission (CCHEN) currently maintains two nuclear research reactors: the Rech-1 research reactor, which is located at the La Reina Nuclear Center in Santiago; and the Rech-2 research reactor, which is located at the Lo Aguirre Nuclear Center about 30 kilometers west of Santiago.

¶5. The Rech-1 research reactor is a 5 megawatt (MW) multipurpose, pool-type reactor that first achieved criticality on October 13, 1974. Operating about 24 hours a week, the main mission of the Rech-1 research reactor is to produce medical isotopes for the Chilean medical industry. The Rech-1 research reactor was fully converted to use low enriched uranium (LEU) fuel in May 2006, but is currently storing 13.6 kilograms of British-origin HEU spent nuclear fuel enriched to 45 percent, which is the material eligible for removal to the U.S. The LEU fuel for the Rech-1 reactor was provided by the Russian Federation.

¶6. The Rech-2 research reactor is also a multipurpose, pool-type reactor that was originally engineered at 10 MW for Chilean defense programs and first achieved criticality in 1977. In 1989, the reactor was redesigned and licensed to operate at 2 MW, but is currently in extended shutdown. Unlike the Rech-1 research reactor in Santiago, the Rech-2 reactor is not converted to use LEU fuel and still contains 4.3 kilograms of French-origin HEU enriched to 90 percent in the reactor core, which is additional material eligible for removal to the U.S. The HEU raw material for the Rech-2 reactor was originally provided by France, but the fuel assemblies for this reactor were manufactured in Spain.

¶7. Although the redesign and commissioning of the reactor was successful, this reactor has seen very limited operation and fuel assemblies in the reactor core are therefore regarded as lightly irradiated; therefore, they are not considered to be "spent nuclear fuel." There are also two fresh HEU assemblies (about 275 grams of

fresh HEU), as well as a small quantity of uranyl nitrate liquid (280 grams) stored in the reactor vault. The two fresh HEU assemblies and the uranyl nitrate are also French-origin and enriched to 90 percent. (COMMENT: The uranyl nitrate is a liquid chemical compound of uranium that does not meet transportation requirements to the U.S. To remedy this situation, CCHEN has agreed to use its existing capabilities to convert and downblend the HEU to LEU in country. The two fresh HEU fuel assemblies are eligible to be removed to the U.S. End comment.)

The Plan: Chile Virtually Free of HEU by April 2010

¶8. In summary, the total quantities of HEU nuclear fuel and material identified for removal to the U.S. are: 13.6 kilograms of British-origin HEU enriched to 45 percent from the Rech-1 research reactor; and 4.3 kilograms of lightly irradiated French-origin HEU enriched to 90 percent and 275 grams of French-origin fresh HEU enriched to 90 percent from the Rech-2 research reactor.

¶9. Following an agreed path forward on removal, Chile would effectively become HEU-free by April 2010 (meaning only a very small quantity of HEU, less than 1 kilogram, would remain in the form of fission chambers for nuclear research). This would contribute directly to President Obama's goal to secure all vulnerable nuclear material within four years. In addition, upon successful implementation of the agreed path forward, this progress could be announced in May 2010, at the upcoming NPT REVCON.

¶10. Finally, GTRI will also repatriate U.S.-origin disused radioactive sealed sources to the U.S. for disposition. Last year, a GTRI team from the Los Alamos National Laboratory packaged over 400 disused U.S.-origin radioactive sealed sources for future return to the U.S. The packaged sources are securely stored at the Lo Aguirre site and will be repatriated to the U.S. along with the foreign-origin HEU fuel from the two research reactors.

Summary of GTRI-CCHEN Meeting

¶11. Begin text:

Meeting Summary

Discussions between DOE/NNSA and the Chilean Nuclear Energy Commission (CCHEN)

April 23, 2009

Representatives from the U.S. Department of Energy's National Nuclear Security Administration (DOE/NNSA) Global Threat Reduction Initiative and the Chilean Nuclear Energy Commission (CCHEN) met in Santiago on April 21-23, 2009 to discuss cooperative efforts related to the removal of British- and French-origin Highly Enriched Uranium (HEU) from the Rech-1 and Rech-2 research reactors to the U.S. for storage and disposition.

The primary purpose of the visit was to discuss the removal of British-origin HEU spent nuclear fuel from the Rech-1 research reactor and French-origin fresh and lightly-irradiated HEU from the Rech-2 research reactor to the U.S. for storage and disposition.

Below is a key summary of the meeting:

-- DOE/NNSA representatives noted the very long and productive relationship with Chile regarding peaceful nuclear cooperation and expressed their gratitude for Chile's participation and important contributions to NNSA nonproliferation programs, especially in the area of nuclear and radiological security.

-- CCHEN recognized the willingness of DOE to help address the issue of removal of the British and French-origin HEU fuel.

-- Experts from DOE/NNSA and CCHEN discussed the removal of the HEU at both Rech-1 and Rech-2 as well as the already packaged sealed radiological sources to the United States and agreed to the following:

Removal of the British- and French-origin HEU fuel from Rech-1 and Rech-2 and the already packaged sealed radiological sources:

-- Both DOE/NNSA and CCHEN expressed their ongoing interest in continuing to work together to remove the British-origin HEU spent fuel and French-origin fresh and lightly irradiated HEU fuel from the Rech-1 and Rech-2 research reactors to the United States.

-- DOE/NNSA representatives described the criteria of the revised DOE Record of Decision that grants provisional authorization to accept "gap" nuclear material in the United States and noted that, since no commercial option exists to accept the HEU material, it could be sent to the United States if it meets the acceptance criteria of the Savannah River Site.

-- CCHEN representatives briefed about Rech-1 and Rech-2 fuel status, explaining characteristics and actual condition of the HEU spent fuel of Rech-1 and slightly irradiated fuel at Rech-2. Additionally, CCHEN representatives described their fuel fabrication capabilities.

-- DOE/NNSA representatives visited the Rech-1 and Rech-2 reactor facilities to begin a preliminary characterization of the HEU fuel and the fuel fabrication facilities.

-- DOE/NNSA representatives noted that the British- and French-origin HEU fuel meets the Record of Decision's criteria and agreed to continue plans to remove the material to the United States by April 30, 2010.

-- Representatives from DOE/NNSA officially offered to cover all costs associated with the removal of the British- and French-origin HEU fuel at the Rech-1 and Rech-2 research reactors as well as the U.S.-origin sealed radioactive sources. Under this proposal, DOE/NNSA would be responsible for providing the transportation casks and paying to transport this fuel to the United States in a safe and secure manner.

-- Representatives from DOE/NNSA also agreed to provide funding to CCHEN to fabricate LEU replacement fuel for the removed HEU

materials. It was estimated that the replacement quantity of LEU is approximately 32 kilograms, which is a quantity equivalent to the core replacement.

-- DOE/NNSA and CCHEN agreed to include in the upcoming shipment the more than 400 U.S.-origin radioactive sources that have been jointly packaged and stored at the Lo Aguirre facility.

-- Representatives from CCHEN agreed to convert and downblend a small quantity of HEU uranyl nitrate (approximately 280 grams) currently stored in the HEU storage vault by April 2010.

-- Representatives from CCHEN confirmed that with (1) the upcoming removal of the British-origin and French-origin HEU fuel and (2) the downblending of the small quantity of HEU uranyl nitrate, effectively all remaining HEU would have been removed from Chile. Representatives from DOE/NNSA and CCHEN also discussed sustainability and next steps to be taken on this important topic.

-- Both DOE/NNSA and CCHEN officials signed this record of meeting to formalize the commitment to remove the fuel by April 30, 2010.

Next Steps in this area:

-- Based on this understanding, DOE/NNSA will immediately develop and submit a proposed draft contract to CCHEN to support removal of the fresh and irradiated HEU fuel.

-- DOE will consult with IAEA and Portugal to determine if the RERTR meeting planned for 2010 can be held in Santiago, Chile. DOE will report back to CCHEN by May 30, 2009.

-- DOE/NNSA has designated Mr. Ray Greenberg Jr., Chile Country Officer, and Mr. Chuck Messick, Foreign Research Reactor Spent Nuclear Fuel Acceptance Program Manager, as the lead U.S. points of contact on this issue.

-- CCHEN has designated Mr. Juan Klein and Mr. Gonzalo Torres as the lead Chilean points of contact on this issue.

-- Both sides expressed their great appreciation for this agreed path forward, which lays out expanded cooperation with Chile.

/SIGNED/ /SIGNED/

Andrew Bieniawski Fernando Lopez
Deputy Assistant Secretary Executive Director, CCHEN
For Global Threat Reduction
DOE/NNSA

End Text.

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